

CLAIMS

1. A wave-processing method for a core metal of a wet friction material comprising the steps of: stamping out a material steel sheet so as to form a core metal blank having a shape corresponding to a shape of the core metal by a stamping die, and giving a wave shape to the core metal blank in a circumferential direction thereof by a special die at the same time as or after the stamping step;

wherein the special die has a main punch as an upper die and a counter punch as a lower die, the main punch and the counter punch have compression faces respectively formed with the wave shape while having a micro-protrusion at a portion corresponding to a top point of the wave shape; and

wherein the core metal blank is compressed between the main punch and the counter punch so that the micro-protrusion is cut into the core metal blank so as to form a notch on the core metal blank.

2. A wave-processing method for a core metal of a wet friction material comprising the steps of:

compressing a material steel sheet by a die having micro-protrusions on an entire surface so as to form notches of a net shape composed of many curves at a front surface and a rear surface of a portion to be the core metal of the material steel sheet, thereby correcting a flatness of the material steel sheet at the portion;

stamping out the material steel sheet after the compressing step so as to form a core metal blank having a shape corresponding to a shape of the core metal by a stamping die; and

giving a wave shape to the core metal blank in a circumferential direction thereof by a special die at the same time as or after the stamping step;

wherein the special die has a main punch and a counter punch, the main punch and the counter punch have compression faces respectively formed with the wave shape; and

wherein the core metal blank is compressed between the main punch and the
5 counter punch.

3. A wave-processing die for a core metal of a wet friction material for stamping out a material steel sheet so as to form a core metal blank having a shape corresponding to a shape of the core metal, and giving a wave shape to the core
10 metal blank in a circumferential direction thereof at the same time as or after stamping, comprising:

a main punch having a compression face; and

a counter punch having a compression face oppositely disposed to the compression face of the main punch;

15 the compression faces of the main punch and the counter punch being respectively formed with the wave shape while having a micro-protrusion at a portion corresponding to a top point of the wave shape;

wherein the core metal blank is compressed between the main punch and the counter punch so that the micro-protrusion is cut into the core metal blank so as to
20 form a notch on the core metal blank.

4. A wave-processing die for a core metal of a wet friction material according to claim 3, in which the micro-protrusion has a height of about 1% to 5% of a thickness of the core metal and a width of about 50 μ m to 500 μ m.

25

5. A wave-processing die for a core metal of a wet friction material according to claim 3, in which the micro-protrusion has a shape composed of a plurality of first lines extending straightly in a radial direction of the core and a plurality of second lines extending straightly or curvedly substantially in a circumferential direction of the core metal while crossing the first lines.

6. A wave-processing die for a core metal of a wet friction material according to claim 3, in which the micro-protrusion has a shape composed of an aggregate of dots having a pyramid-shape.

10

7. A wave-processing die for a core metal of a wet friction material according to claim 3, in which the micro-protrusion has a cross-section of a wedge and the micro-protrusion of the main punch is shifted in position from the micro-protrusion of the counter punch in a circumferential direction of the core metal.

15

8. A wave-processing die for a core metal of a wet friction material according to claim 3, in which the micro-protrusion has a shape of a broken line.

9. A wave-processing die for a core metal of a wet friction material according to claim 3, in which the micro-protrusion has a length such that opposite ends of the notch formed on the core metal by the micro-protrusion are positioned 0.2mm or more away from outer and inner circumferences of the core metal.

10. A wave-processing die for a core metal of a wet friction material comprising:
a first processing die for stamping out a material steel sheet so as to form a

25

core metal blank having a shape corresponding to a shape of the core metal and for giving a wave shape to the core metal blank in a circumferential direction thereof at the same time as or after stamping;

the first processing die having a main punch and a counter punch
5 respectively having compression faces disposed opposite to each other and being respectively formed with the wave shape;

a second processing die for correcting a flatness of the material steel sheet;
and

the second processing die having a main punch and a counter punch
10 respectively having compression faces disposed opposite to each other and being respectively formed with micro-protrusions for forming a net shape composed of many curves;

wherein the core metal blank is compressed between the main punch and the counter punch of the first processing die so as to give the wave shape to the core
15 metal blank after the material steel sheet is compressed between the main punch and the counter punch of the second processing die so that the micro-protrusions are cut into the core metal blank so as to form notches of the net shape composed of the many curves on the core metal blank.